Title

Intrinsically Safe Ex ia UPS

Type 12/NMH/288

User's Manual

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2 INTRODUCTION

This document specifies and describes the correct installation, operation, and servicing of the Austdac UPS Type 12/NMH/288.

The UPS Type 12/NMH/288 is available with various input/output connector/terminal block options.

3 GENERAL DESCRIPTION

The Austdac UPS Type 12/NMH/288 has been designed to provide battery backup for equipment that operates from a nominal 12 volt supply and has a maximum current output of 1A.

The UPS has a secondary current limiter which provides enhanced capacitive load charging. The secondary current limiter limits the output current to 0.9A.

The UPS has a built in charger that will charge the battery and support the specified load. This eliminates the need for surface charging the battery.

The UPS uses Nickel Metal Hydride technology to provide the highest capacity to weight ratio without the troublesome memory effect exhibited by Nickel Cadmium batteries.

The UPS has a built in display to provide users with the following important battery parameters;

- System Okay
- Input Power Available
- Battery Charge
- Output Power
- Service
- Battery capacity

The UPS is also fitted with an optional timer that will disconnect the load after a predefined time period operation in backup mode. A top panel mounted push button can be used to reset the timer and provide load power for another time period. This timer can be disabled if not required.

4 WARNINGS AND PRECAUTIONS

WARNING

- Lethal voltages and currents are present within the UPS.
- Mains voltages are present within the UPS.
- DC Voltages greater than 300V may be present within the UPS.
- Battery voltages greater than 24V may be present within the UPS.
- Battery voltages may be present within the UPS at all times.
- The UPS must be earthed.
- An assembled UPS weighs 34kg.

PRECAUTIONS

- Only qualified personnel shall install and service the UPS.
- Use personal protection equipment.
- Ensure that earth connections are tested.

4.1 USER ACCESS

There are no user serviceable parts within the UPS. The user should not attempt to service the UPS or access the encapsulated electronics of the UPS. The only user accessible controls and displays are mounted on the lid of the UPS.

4.2 STORAGE, INSTALLATION, USE AND MAINTAINANCE REQUIREMENTS

The UPS should only be installed, operated and maintained by qualified personnel. Ensure that all instructions and warnings are observed.

4.2.1 Storage

The specified operating temperature must be maintained during storage.

It is recommended that the UPS is connected to an input mains supply during storage. This will ensure that the UPS is ready for operation.

If the UPS is to be stored without mains power it should be placed in shut down mode to prolong battery life. It is recommended that disruption to the mains supply of the UPS should not exceed 1 month.

The UPS should be stored in a cover area.

4.2.2 Installation

Prior to installation the UPS should be inspected for the following;

- Any external damage to the enclosure.
- Any damage, score marks or foreign debris to any glands or connectors.
- Ensure that the UPS output has been turned off.
- The UPS will usually require the lid to be removed for installation. When the lid is removed the following inspection is required;
    - Inspect for any damage or faults with the gasket.
    - Inspect for any damage, score marks or distortion of the gasket sealing surfaces.
    - Inspect for any damage or foreign objects on PCB0306A mounted on the lid.
    - Check that the switch settings are correct on PCB0306A. Record the settings.
    - Check that there are no foreign objects, debris, moisture or contaminants within the UPS.
    - Check the encapsulation for any signs of cracking.
    - Confirm that the continuity of the earthing of the UPS, case and external protective earths is less than 0.1 ohms and of a suitably rated cable.

Prior to installation the UPS must be connected to an input mains supply for a minimum of 14 hours for charging.

The UPS may be installed in any orientation however access to the display should be considered.

The UPS should be installed in a cover area.

The UPS should be mounted to a stable surface avoiding areas under constant vibration and shock.

Ensure that the UPS is adequately secured to the mounting area.

Ensure that all screws, washers and sealing gaskets are fitted.

5 MODES

The Austdac UPS Type 12/NMH/288 has three operating modes;

5.1 MAINS MODE

In this mode the UPS is powered from a mains supply. The UPS output will be ON and the display will be permanently ON. The UPS will charge the batteries as required. SILBUS communication will be available.

5.2 BATTERY MODE

In this mode the UPS is powered from its internal batteries. The UPS will enter this mode if the mains supply is not available. The UPS output will be controlled as follows;

- Permanently ON
- Under timer control
- Under SILBUS control (after timer has timed out)

The display will always flash the “System OK” LEDs, display “Battery” capacity, Timer percentage remaining (if timer is activated) and the Output Power LEDs.

SILBUS communication will be available.

If the battery level falls below the lower capacity level the UPS will go into shut down mode.

Pressing the push button for 12 seconds will place the UPS in sleep mode.

5.3 SLEEP MODE

In this mode the UPS output is off and the display is off except for the occasional flash of “System OK” LED.

It will enter this mode if the Timer times out or the operator press the push button.

SILBUS communication will be available.

It can come out of this mode into Battery mode under SILBUS control or by pressing the push button for 12 seconds.

5.4 SHUT DOWN MODE

In this mode the UPS is fully powered down. This mode is used for prolong storage or when the battery capacity falls below the lower capacity level.

The UPS output will be OFF.

The display will be OFF.

SILBUS communication will not be available.

The UPS can only be taken out of the mode by turning on the mains supply.

6 PHYSICAL DESCRIPTION

The UPS is housed within a stainless steel enclosure measuring approximately 240mm H x 310mm D x 290mm W.

The actual battery cells are potted within the enclosure to maintain I.S. properties. The outer enclosure may be opened to facilitate wiring and configuration of the UPS.

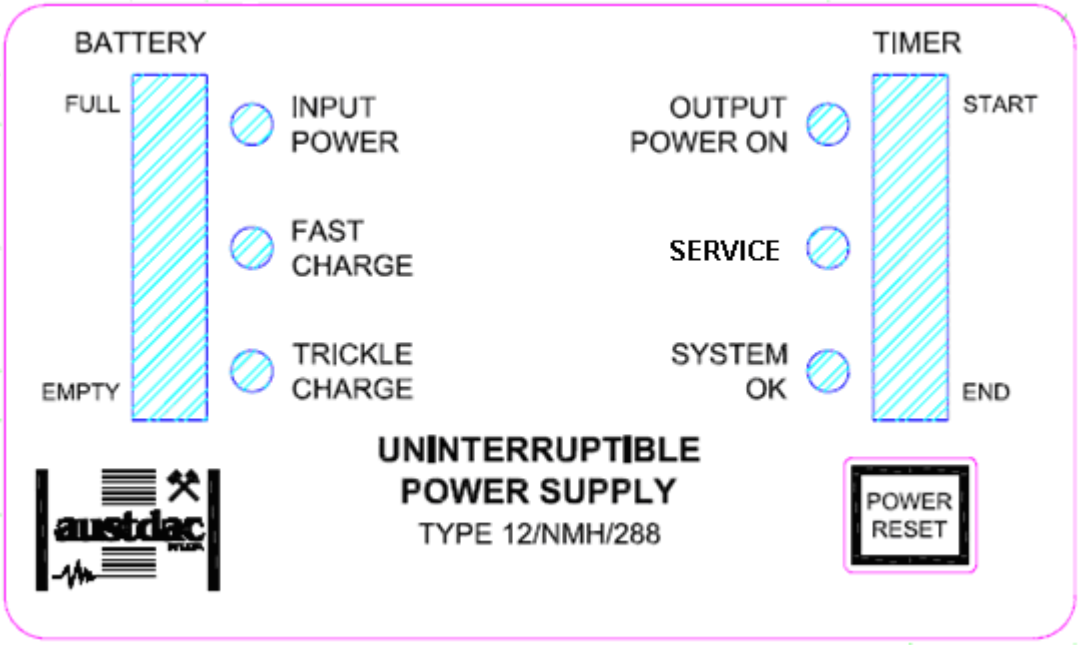
All indications are visible from the top panel and all controls are accessible from the top panel as well.

Mains charging power input cable is provided and passes through an IP55 minimum rated gland mounted on the side of the enclosure. Mains may be looped through the UPS and exits the UPS via an IP55 minimum rated gland mounted on the side of the enclosure.

The I.S. output and communication is via an IP55 minimum rated connector or gland mounted on the side of the enclosure.

7 TOP PANEL DESCRIPTION

The top panel of the UPS contains all the indications and controls necessary to operate the UPS. The display consists of a series of light emitting diodes (LEDs). A push button is provided to reset the timer function or to put the UPS into and out of sleep mode.



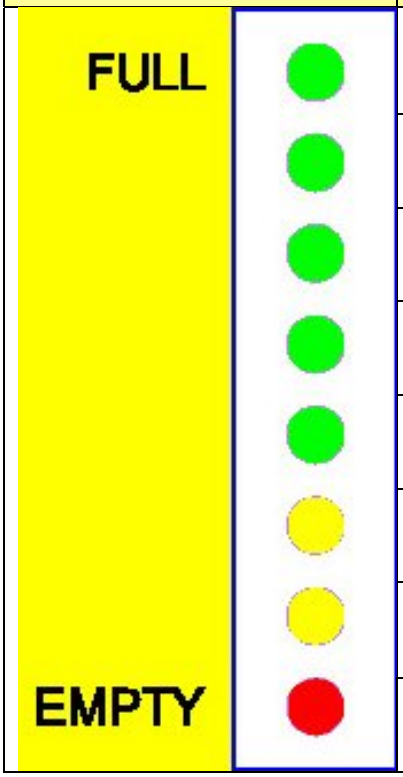
7.1 OPERATION

The full display will operate when the UPS is operating either from mains mode or in battery mode. In sleep operation mode only the “System OK” LED flashes. In shut down mode the display is off.

7.2 BATTERY LEVEL

Battery level will be indicated by the 8 LEDs. The battery level will be determined by the coulomb count as measured by the UPS.

The lower level of the battery level is determined by the battery lower limit capacity.

INDICATOR	BATTERY CAPACITY
	> 80%
	> 70%
	> 60%
	> 50%
	> 40%
	> 30%, This and lower LEDs flash on for 0.1s at 0.8s intervals if 30%-40%
	> 20%, This and lower LEDs flash on for 0.1s at 0.4s intervals if 20%-30%
	< 20%, This LED flashes on for 0.1s at 0.4s intervals if capacity < 20%

7.3 TIMER

Timer status will be indicated by the 8 LEDs. The Timer status will be determined by the time in 100% to 0%. Note that the timer function is set by two switches on the Display PCB. These switches set the timer in minute increments from 1 to 99 minutes. 0 minutes is used to set no timer function.

7.4 SERVICE

The Service LED will flash when the UPS requires servicing. The following flash sequence indicates the type of fault;

Service LED error code cycle is 3.2 seconds, with a 0.4 second gap between error codes. If a particular error is not present then the indicator remains off during that error's allocated time.

- 1 Service Flash & System OK OFF Bad Load test
- 2 Service Flashes & System OK OFF Bad Cell
- 3 Service Flashes & System OK OFF Bad Interboard Comms

- 4 Service Flashes & System OK OFF SILBUS error

Note that any combination of these flashes may occur.

7.5 SYSTEM OK LED

The System OK LED will flash to signify UPS operation.

7.6 INPUT POWER LED

The Input Power LED will be permanently ON when mains power is available.

7.7 FAST CHARGE LED

The Fast Charge LED will be permanently ON when mains power is available and the UPS is fast charging the batteries.

7.8 TRICKLE CHARGE LED

The Trickle Charge LED will be permanently ON when mains power is available and the UPS is trickle charging the batteries.

7.9 OUTPUT POWER ON

The Output Power ON LED will be permanently ON when I.S. power is available.

7.10 START UP DIAGNOSTICS

During initial start up from shut down the Display PCB will sequence the LEDs in a test pattern before operating normally.

7.11 POWER RESET PUSH BUTTON

The push button has the following three functions;

7.11.1 Switch between Sleep and Battery Mode

The push button can place the UPS in and out of sleep mode by pushing down the key for 12 seconds.

7.11.2 Restart Timer

The timer function of the UPS may be restarted using the push button for 1second, while the timer is running.

If the UPS is under SILBUS control this function may be over ridden.

7.11.3 Shut Down Mode

Shut down mode places the UPS into its lowest power state and is used for storage of the UPS.

Within 5 seconds of removing mains power the UPS can be placed into sleep mode by pressing and holding the push button for more than 30 seconds. The display LEDs will turn OFF.

8 COMMUNICATIONS

The UPS has a SILBUS communication port.

8.1 SILBUS

SILBUS communication is used to monitor;

Fastlink Protocol (Signal Channel)	Analink Protocol (Multiple Channels)
Battery Capacity 0-100%	Battery Capacity 0-100%
UPS Load 0-1000mA	
Timer time 0-100%	
Output On/Off	
Main available/not available	Main available/not available
Watchdog Tick or Service Required	

The Fastlink data is as follows;

- Bit 0..3 Battery Level (in 6.67% increments)
- Bit 4..7 Output Load (in 66.67mA increments
- Bit 8..11 Timer % (in 6.67% increments)
- Bit 12 Output On
- Bit 13 Timer On
- Bit 14 Mains On
- Bit 15 Watchdog

SILBUS FASTLINK STATUS CHANNEL				
15 Watchdog	**14** Mains On	**13** Timer On	**12** Output On	**11 – 8** Timer Percentage In 6.67% Increments
7 – 4 Output Current In 66.667mA Increments				**3 – 0** Battery Capacity Remaining In 6.67% Increments

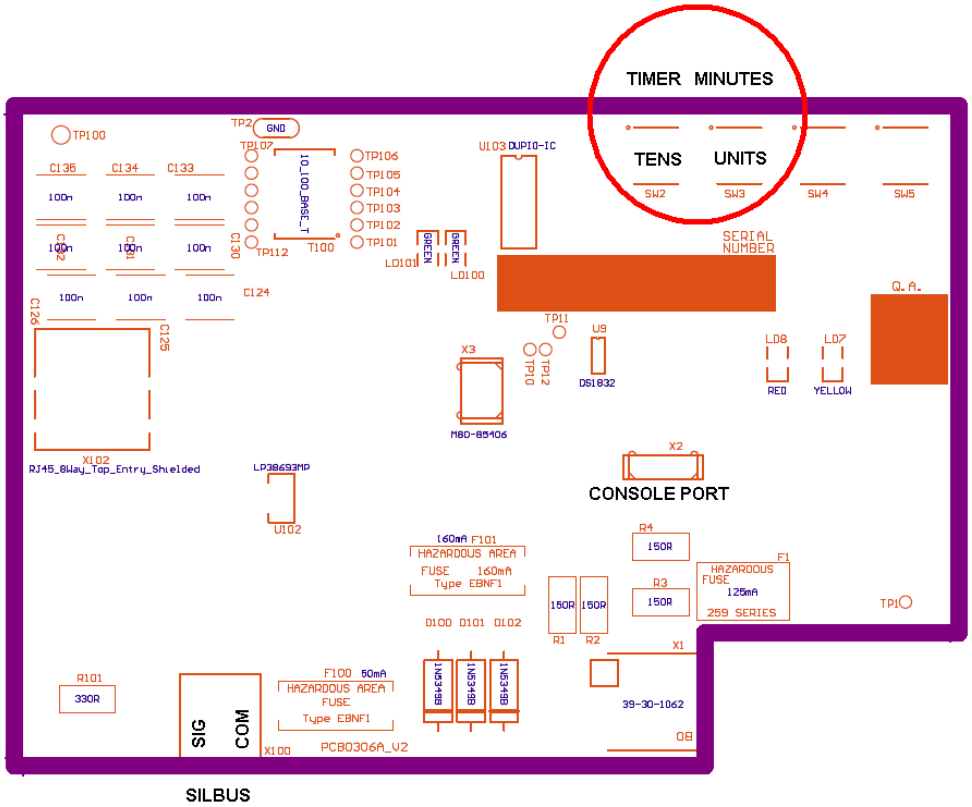
The UPS output can be controlled by SILBUS by enabling the output channel functional matrix. Functional matrix can be control by single SILBUS channel or by functional matrix consisting of more than one term (SILBUS channel). The SILBUS control of UPS is after timer is expired. If SILBUS is removed or become faulty from the UPS while actively on (i.e. UPS is in battery mode) then revert to Timer and remains on until timer runs it course or SILBUS is restored.

9 TIMER CONFIGURATION

The timer may be configured to be active or inactive as determined by the application. The activity of the timer is selected by a PCB mounted switch behind the UPS top panel. The switches, SW2 and SW3, are shown below.

SW2 sets tens of minutes and SW3 sets units of minutes. Setting SW2 and SW3 to 00 will disable the timer and cause the UPS to run continuously in the event of a loss of mains power.

NOTE: The switch settings are read when main fail and UPS is running under battery power.

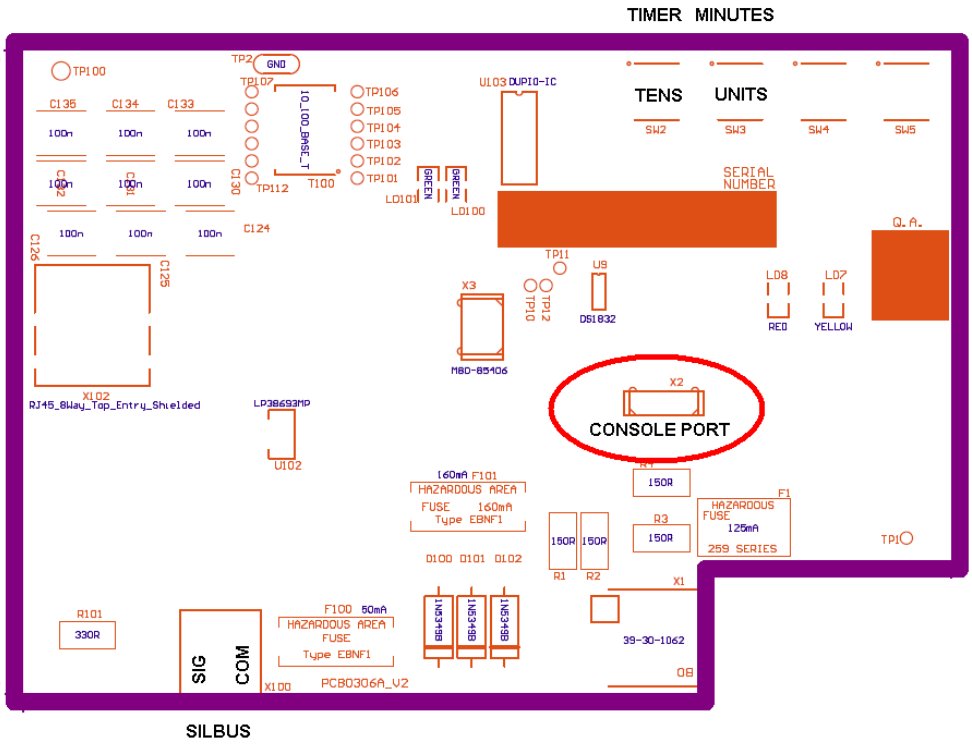


10 UPS CONFIGURATION

The UPS can be configured using the Console Port and MEAN1.

10.1 CONSOLE PORT

The console port consists of a small four pin connector (X2) mounted on PCB0306A mounted behind the top panel. Access to the console port can be gained by removing the lid of the UPS and connecting to the PCB0306A attached to the bottom of the lid.



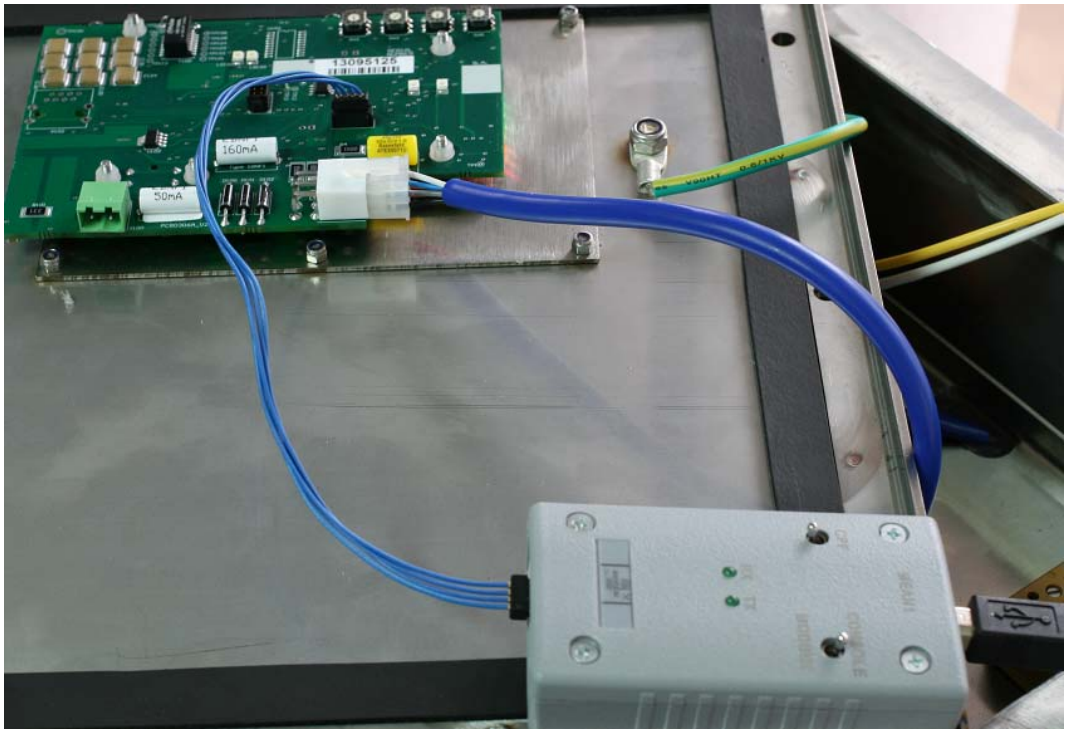
To use the console port an Austdac MEAN1 interface, A to B USB cable and laptop computer running Hyper Terminal are required.

For more detail on the console port, MEAN1 interface and their use refer to Austdac document 53-018-12.

NOTE: Connecting the MEAN1 to the UPS may cause the display to reset. This is normal.

10.2 CONSOLE PORT OPERATION

The console port should be connected to a laptop running a terminal emulation program such as Hyper Terminal via the Austdac interface type MEAN1 and a USB cable as shown in the following photograph.



The UPS certification places restrictions on what may be connected to the console port, the connection of an interface other than the Austdac MEAN1 to the console port will invalidate the certification of the receiver.

The terminal emulation program should be configured to 19200 baud, 8 data bits, one stop bit, no parity, no flow control and DEC VT100 terminal emulation.

Once communications have been established with the UPS, it will display a screen of information that includes software version, software checksum, and a list of commands followed by the console port prompt.

The prompt includes an abbreviation of the receiver type number. **`UPSD::>`**

Commands are invoked by entering the command name followed by any optional modifiers, keywords and the “ENTER” key. The enter key is shown in the following examples as a “ ↵” symbol.

10.3 HELP (HELP) COMMAND

The HELP command prints a list of all available commands and shows the syntax for each command. Optional command modifiers are shown within [ ] while mandatory modifiers are shown within < >. An example of a screen output follows:

```
HELP     [1..7] Level of Help | [0 = all]      [] Optional, <> Required, | Or
VER                                            Firmware version of Product
REPEAT   [LF/CR] [Secs between lines]          Repeat Cmd, Linefeed/Carriage
STACK                                          Display peak stack usage
DISP                                           Display current status of UPS
ERRORS                                         Display any error codes
UART                                           Display uart status
LOG      [event]                               UPS event log dump
RTC      [<SET> <YY:MM:DD hh:mm:ss>]           Set UPS RTC
         ********* Level 2: SILBUS MENUS ***********
SBMAP                                          Display SILBUS I/O Map
SBSTAT                                         Display SILBUS Status
SBGET    <A1-P8>                               Display a SILBUS Chan Status
ANASEL   [<SET> <ANALINK|FSTLINK>]             Analog protocol for params
FSTMRK   [<SET> <A1-P8,DISABLE>]               Set Fastlink marker channel
SBDATA   [<SET> <A1-P8,DISABLE>                Set SILBUS Data Status Chan
SBPWR    [<SET> <A1-P8,DISABLE>                Set SILBUS Pwr On Status Chan
LOGIC    [<SET> <N/AND|N/OR>]                  Select logic function
ADD      <SET> <Terms|!Term|Term#>             Add terms to relay
DEL      <SET> <Terms|!Term|Term#>             Delete terms from relay
CFGUP                                          Upload Configuration Text
CFGDWN                                         Download Configuration Text
-------------------------------------------------------------------------------
```

10.4 VERSION (VER) COMMAND

The VER command is used to display the serial number, abbreviated type number, software version and program memory checksum of the UPS. The command can be invoked as shown in the following example:

```
UPSD::>ver

UPS Display Software 1V03 0x1955  SN:13095125

UPS Base Software 1V03 0xEDA1  SN:13105223
```

This command is useful when the user needs to know the software version or serial number. The program memory checksum is useful to confirm that a software update has completed successfully without any programming errors.

10.5 REPEAT (REP) COMMAND

The REP command is used after another command to continuously repeat that command. As an example the UART command can be executed followed by the REPEAT command to provide a continuously updating display of the UART Comms. The display will continue to update until any key is hit. The UPS will respond by displaying the prompt.

```
UPSD::>uart
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 33995

UPSD::>rep
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 34055 (changing)
```

In this mode the repeat command writes over the previously displayed information, if required, the repeat command can be made to refresh the information on a new line by entering LF (line feed) as part of the command invocation. The repeat command refreshes the display every one second by default. The refresh rate can be slowed by entering the refresh rate in seconds as part of the repeat command as shown in the following command:

```
UPSD::>uart
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35494

UPSD::>rep lf 5
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35547
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35597
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35648
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35698
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35748
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35799
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35849
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt 35899
```

As can be seen from the above example the repeat command refreshed the status of UART Comms. on a new line every five seconds. In the LF mode a record of the status of the UART Comms. can be viewed on the screen.

10.6 STACK (STACK) COMMAND

The STACK command is provided to allow the technician to gauge the health of the UPS microprocessor and its code by displaying the maximum usage of the program stack. The display is a peak value of the stack usage since the UPS was powered up. The command can be invoked as shown in the example below:

```
UPSD::>stack

Stack usage/size = 382/1024

Percentage Used = 37%
```

This command would typically only be used when requested by an Austdac software engineer.

10.7 DISPLAY (DISP) COMMAND

The DISP command is provided to allow the technician to monitor the health of the UPS The command can be invoked as shown in the example below:

```
UPSD::>DISP
UPS CURRENT STATE
 Input Power  : OFF
 Fast Charge  : OFF
 Output State : OFF
 Service State: OFF
 Timer State  : OFF
ANALOG VALUES
 Timer Set Time : 11Min
```

```
 Timer Level    : 0.0%
 Battery Level  : 93.4%
 Battery Voltage: 31.7V
 Load Current   : 0mA
SILBUS CHANNEL ALLOCATION
 Using Fastlink Protocol Ana/Fastlink Status Channel: B1
 Mains Power State Channel: B5
 Digital Output Control = B2*!G5
```

The information supplied is as follows;

- Input Power : This indicates whether mains power is available to the UPS
- Fast Charge : This indicates whether the batteries are being fast charged.
- Output State : This indicates whether the ia output is turned ON or OFF.
- Service State : This indicates that the UPS requires service attention.
- Timer State : This indicates the timer is or isn't running
- Timer Set Time : What the timer is set to via the switches SW2 and SW3.
- Timer Level : If the timer is running this indicates how much time is left to run before the UPS switches the output OFF.
- Battery Level : This is the battery level noting that 0% is not a fully discharged battery.
- Battery Voltage : The total battery voltage. The normal battery level will be greater than 28V
- Load Current : This is the load current measured by the UPS. Note that this is an approximation and for accurate load currents an external measurement should be performed.
- Status Channel : Identifies the Fastlink/Datalink channel or Analink channel
- Mains Power State : Identifies the digital transmit channel
- Digital Output Control : Identifies the digital control matrix or resolver

10.8 ERROR (ERROR) COMMAND

The ERROR command is provided to allow the technician to list any errors detected by the UPS. The command can be invoked as shown in the example below:

```
UPSD::>errors

Comms to LTC Monitor
```

10.9 UART (UART) COMMAND

The UART command is provided to allow the technician to monitor the health of the UPS to SILBUS communication. The command can be invoked as shown in the example below:

```
UPSD::>uart
Comms are OK,  Frame     0,Execption     0,CRC     0,Cnt  4299
```

10.10 LOG (LOG) COMMAND

The LOG command is provided to allow the technician to monitor the logs of the UPS. The command can be invoked as shown in the example below:

```
UPSD::>log
Stored events : 958
INDEX      TIME        EVENT   DATA, DATA (DEC)
-----------------------------------------------
[001]   0x00000214     0xAB,  0x0000       0
[002]   0x000001D4     0xAA,  0x003C      60
[003]   0x000001D2     0xA7,  0x0000       0
[004]   0x000001B4     0xE2,  0x03E8    1000
[005]   0x000001B3     0xA6,  0x0000       0
[006]   0x000000F3     0xAB,  0x0000       0
[007]   0x000000B4     0xAA,  0x003C      60
[008]   0x000000B4     0xFF,  0xAB01   43777
[009]   0x000000B3     0xAB,  0x0000       0
[010]   0x00000085     0xA7,  0x0000       0
```

See document 00-037-37 Significant Event Register for interpretation of events.

10.11 REAL TIME CLOCK (RTC) COMMAND

The RTC command is provided to allow the technician to monitor the health of the UPS. The command displays any internal errors for analysis. The command can be invoked as shown in the example below:

```
UPSD::>rtc

RTC Wed Dec 11 12:15:31 2013
```

10.12 SILBUS MAP COMMAND

The SILBUS map command allows the operator to obtain a snapshot of the SILBUS network to which the receiver is connected. The map shows all of the SILBUS channels available on the network. The map consists of a table with a heading of groups below which is displayed the channels using ones and zeros. Each group is shown vertically with 1 at the top and 8 at the bottom. A one indicates an ON channel and a zero indicates an OFF channel. An example of an SBMAP is shown below with channels A4, P7 and P8 on or active:

```
UPSD::>SBMAP ↵
ABCDEFGHIJKLMNOP
0000000000000000
0000000000000000
0000000000000000
1000000000000000
0000000000000000
0000000000000000
0000000000000001
0000000000000001
```

```
UPSD::>_
```

The SBMAP command is particularly useful when used with the repeat command as this will display a continuously updated table.

10.13 SILBUS STATUS COMMAND

The SILBUS status command displays the number of SILBUS channels available on the connected SILBUS network, a SILBUS synchronisation pulse count and a SILBUS error count. This command is used to determine if the connected SILBUS network is functioning correctly and how many channels are available. The error count should typically be zero while the sync count should be incrementing. Once again the use of the repeat command will provide a dynamic updating display. An example of the SBSTAT command follows:

```
UPSD::>SBSTAT ↵
No. Chan = 128, Sync Count = 17807, Error Count = 0

UPSD::>_
```

The error count will be non zero whenever the connected SILBUS network is out of specification. The error count can be non zero if the connected SILBUS network channel generator has its power supply cycled off and on. These error counts should be ignored.

10.14 SILBUS GET COMMAND

The SILBUS get command is used to display the status of one selected SILBUS channel only. If this command is used in conjunction with the repeat command a continuously updating display can be achieved. The command is invoked by entering the command name followed by the desired channel address as shown in the two examples below:

```
UPSD::>SBGET M3 ↵
M3 = OFF

UPSD::>SBGET B7 ↵
B7 = ON

UPSD::>_
```

10.15 ANALOGUE SELECT COMMAND

This command is used to display and configure the analogue transmission protocol for each of the analogue inputs. Each analogue input can be configured to either Analink or Fastlink. The current selected transmission protocols can be displayed by simply entering the command name as shown in the example below:

```
UPSD::>ANASEL ↵

SILBUS Analog Protocol = Fastlink
```

If the command name is entered with additional attributes the analogue transmission protocol can be configured to Fastlink or Analink for each analogue input. An example of configuring input 1 is shown below:

```
UPSD::>ANASEL SET FASTLINK ↵
SILBUS Analog Protocol = Fastlink
```

10.16 FASTLINK MARKER COMMAND

This command is used to display and configure the FASTLINK marker SILBUS channel address. A valid FASTLINK marker is required whenever any one of the analogue inputs is configured to transmit using the FASTLINK protocol. The marker is generated by the GSW1 channel generator and can be any valid SILBUS channel address. Only one marker is required per SILBUS field bus network. The current marker channel address can be displayed by simply entering the command name as shown in the example below:

```
UPSD::>FSTMRK ↵
Fastlink Marker is A1
```

The example below shows the format of the command when the marker address is configured. The keyword “SET” is required to invoke a change, followed by the SILBUS channel address of the FASTLINK marker. If FASTLINK is not to be used by the UPS transmitter then the marker channel should be disabled. The keyword “DISABLE” is used when the marker channel is not required.

```
UPSD::>FSTMRK SET DISABLE ↵
Fastlink Marker is --
```

10.17 SBDATA COMMAND

This command is used to configure SILBUS channel use to send status data about the UPS. If Fastlink protocol selected then following information is sent:

- Battery Level (in 6.67% in protocol selectedcrements)
- Output Load (in 66.67mA increments
- Timer % (in 6.67% increments)
- Output On
- Timer On

- Mains On
- Watchdog

If Analink protocol selected then this channel only transmit battery capacity of value between 0-255.

To set data channel simply entering the command as shown in the example below:

```
UPSD::>SBDATA set B1

 Ana/FastLink Status Channel: B1
 Mains Power State Channel: B5

UPSD::>
```

10.18 SBPWR COMMAND

This command is used to configure SILBUS channel to be allocated to indicate Main Power Output. As it a digital channel is can be used in either Analink or Fastlink, though it double up with BIT14 in Fastlink data channel in previous command.

To set Main Power Output channel simply entering the command as shown in the example below:

```
UPSD::>SBPWR set B5

 Ana/FastLink Status Channel: B1
 Mains Power State Channel: B5
```

10.19 LOGIC COMMAND

This command is used to display and configure the logic function type of the matrices logic resolver to control the UPS. The UPS has single logic matrix. The valid logic functions are OR, NOR, AND, NAND and OFF. The current logic type of the UPS matrix can displayed by simply entering the command name as shown in the example below:

```
UPSD::>LOGIC ↵

Logic is AND
```

If the command name is entered with additional attributes the logic function can be configured to any of the valid logic types i.e. AND, NAND…

For example of configuring the UPS:

```
UPSD::>LOGIC SET AND ↵

Matrix logic changed
Logic is AND

UPSD::>_
```

10.20 ADD COMMAND

This command is used to configure the specified logic resolver, allowing terms to be added to the logic function. The terms are in the form of valid SILBUS channel addresses and groups. Terms may also be inverted to allow negative logic to be used. The add command does not display current logic resolver configuration. See the DISP command for information on displaying the current configuration. Examples of adding terms to logic matrix using the ADD command are shown below:

```
UPSD::>ADD SET B1 !G5 ↵

 Digital Output Control = B1*!G5

UPSD::>_
```

The first example shows the first term B1 and not G5 being added to the matrix or resolver.

10.21 DELETE COMMAND

This command is used to configure the specified logic resolver, allowing terms to be deleted from the logic function. The terms are in the form of valid SILBUS channel addresses and groups. The delete command does not display current logic resolver configuration. See the DISP command for information on displaying the current configuration. Examples of deleting terms from logic matrix using the DEL command are shown below:

```
UPSD::>DEL SET G5

Digital Output Control = B1*!G5

UPSD::>_
```

This example shows the term G5 being removed from the AND logic function.

10.22 UPLOAD CONFIGURATION COMMAND

The upload configuration command is used to extract the configuration profile of the UPSD via the MEAN1 interface and record it in a file on a PC. Having an exact copy of the configuration is useful for record keeping and future cloning of new UPSD transmitters for maintenance or system expansion. The upload is invoked by entering the command name without any attributes as shown in the example below.

```
UPSD::>CFGUP ↵
CFGDWN
S00300000FC
S1130000000001001022E00805600010500000CF
S113001080000000800000008000000080000000DC
S11300208000140008001E00090028000A000000D7
S1130030800000008000000064920000011002ED9AE
S9030000FC

UPSD::>_
```

The configuration is uploaded and displayed on the screen in Motorola S1-S9® HEX format. This data format includes headers and checksums to guard against errors and corruption of the data. The first line of the uploaded configuration is the keyword “CFGDWN” this does not form part of the data but is included to help with the configuration download process, see section 10.23 below for details.

To save the configuration to a file, open Notepad or a similar non-word processing editor, highlight the uploaded configuration as indicated below and copy to Notepad via the clipboard. The Notepad file should then be saved with a meaningful title that reflects the application e.g. UPS_xxx.CFG. When highlighting the uploaded configuration, ensure that the invisible carriage returns (CR) at the end of all lines are included. Also ensure that the CFGDWN keyword is included.

```
UPSD::>CFGUP ↵
CFGDWN
S00300000FC
S113000000000001001022E00805600010500000CF
S113001080000000800000008000000080000000DC
S113002080001400008001E00090028000A000000D7
S113003080000000800000006492000011002ED9AE
S9030000FC

UPSD::>_
```

The copy and paste method is used in this manual because it is the most universal method that works with all terminal emulation programs such as HyperTerminal®. Do not use an editor that introduces hidden formatting characters as a future download may not work with these characters in place. Many terminal emulation programs have automatic means to upload the configuration directly into a file; these are not described here as they differ from program to program but there is no restriction on using these features. Austdac is planning to release a complete tool to allow direct upload, download and editing of the configuration profile.

10.23 DOWNLOAD CONFIGURATION COMMAND

The download configuration command is used to take a previously saved configuration from a file and download it to the target UPS. This method of configuration ensures exact cloning during maintenance and system expansions.

Communications with the target must first be established via the MEAN1 interface and a terminal emulation program such as Hyper Terminal®. The cursor should be left at the UPSD prompt as follows.

```
UPSD::>_
```

Open the previously saved configuration file in Notepad or a similar non-word processing editor and highlight the configuration as shown below.

```
CFGDWN
S00300000FC
S113000000000001001022E00805600010500000CF
S113001080000000800000008000000080000000DC
S113002080001400008001E00090028000A000000D7
```

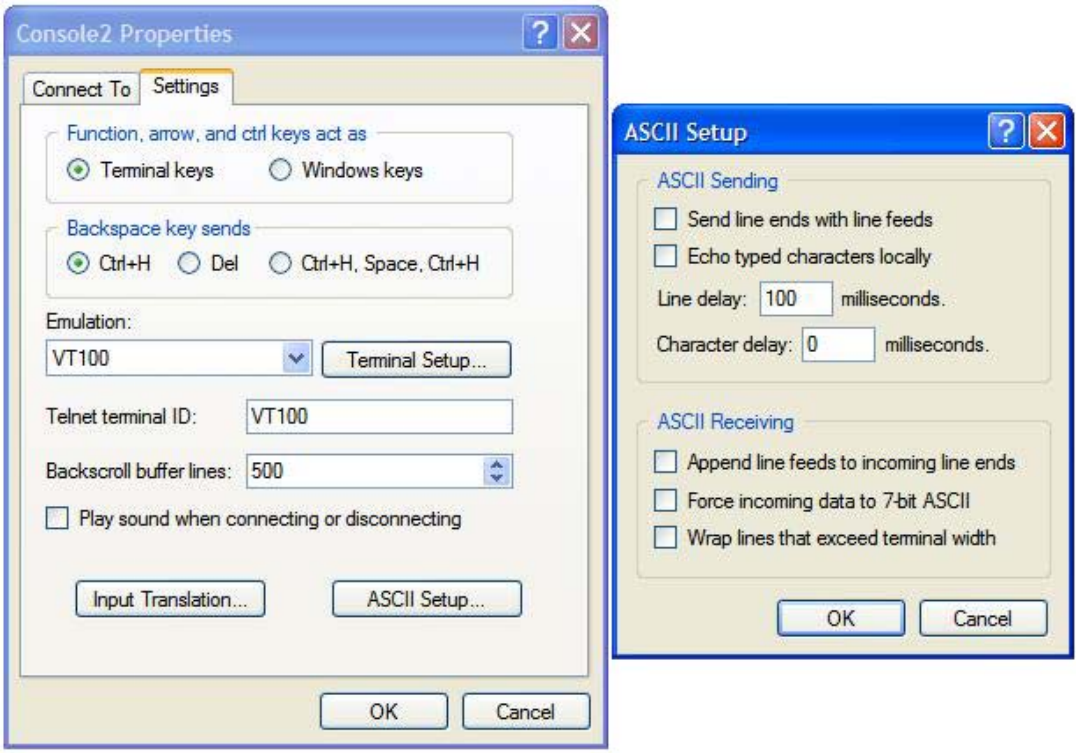
```
S113003080000000800000006492000011002ED9AE
S9030000FC
```

Copy and paste the configuration from Notepad to the UPSD::> prompt in Hyper Terminal as shown below. Note CTRL-V does not work in Hyper Terminal.

```
UPSD::>CFGDWN
S00300000FC
S1130000000001001022E00805600010500000CF
S11300108000000080000000800000008000000DC
S1130020800014000800 1E00090028000A000000D7
S113003080000000800000006492000011002ED9AE
S9030000FC↵

UPSD::>_
```

The first line of the configuration contains the keyword “CFGDWN” which instructs the target to accept the data records. This “CFGDWN” keyword should have been copied from a previous upload and saved in the configuration file. Automatic file transmission features of the terminal emulation program may be used to download configuration files.



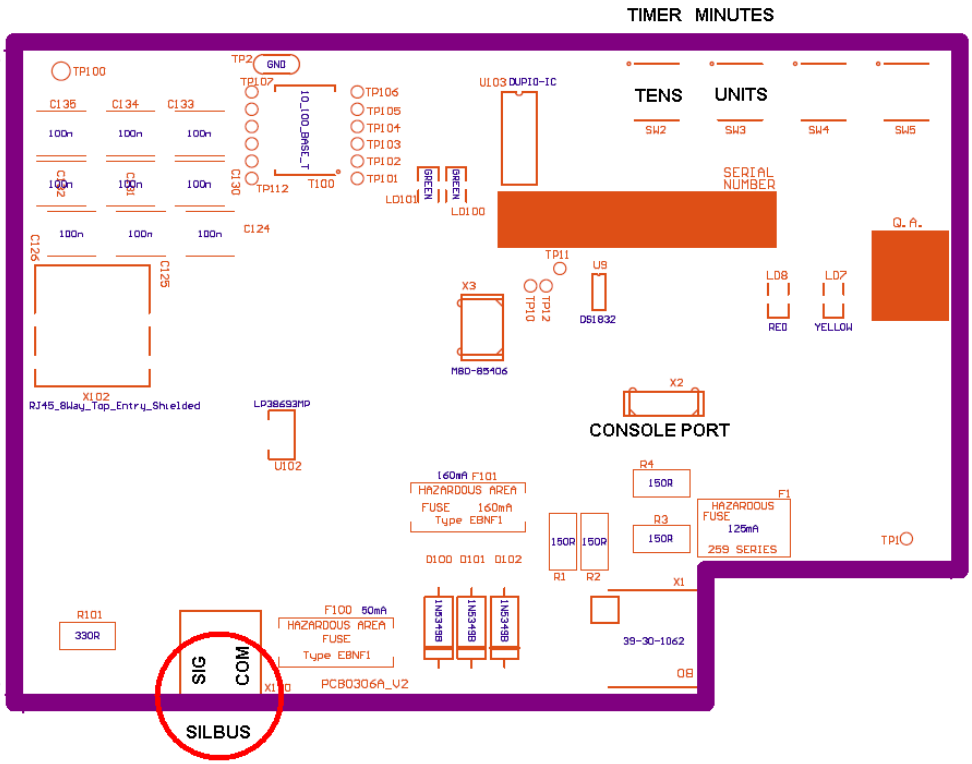
Photograph 1 Hyper Terminal delay setup

The terminal emulation program should be set up to allow a 100ms wait period after the carriage return at the end of each line during a download, this gives the target time to process the incoming data.

10.24 SILBUS PORT

To connect the UPS to SILBUS a suitable cable must be used that meets the entity parameters of the SILBUS port. For details of this please refer to the certificate. The cable must also be able to be sealed in the gland fitting to maintain the IP rating of the UPS.

The SILBUS signal and common wires are connected to the PCB located on the lid of the UPS as shown below.



11 SHUT DOWN MODE

The UPS has a special mode called “shut down mode”. This mode is entered when the battery passes its 10% capacity limit. This mode disconnects the battery from all loads and shuts down the UPS processors. No LEDs will flash or be lit when the UPS is in this mode.

The UPS can also be placed into shut down mode by removing the mains power and then within 5 seconds, press and hold the push button for 30 seconds.

The UPS can only be taken out of this mode by applying mains power to the UPS. The mains power must be maintained until the batteries have been charged above their 10% capacity.

12 SERVICE MODE

The UPS monitors its performance and periodically tests the batteries and itself. If the UPS detects that it is operating below its design parameters it will indicate that it requires servicing. Operation of the UPS will normally still be possible however the standby time may be reduced.

13 SELF TEST MODE

The UPS can perform a full self test which will fully test the batteries and the UPS. This mode should only be conducted when the UPS is not in service. Additional test items are required for this test mode.

Please contact Austdac for further details.

14 INPUT SUPPLY CONSIDERATIONS

It is important to confirm that the supply input voltage is greater than the minimum input voltage (110V less 10%). If the input voltage drops below this level the UPS batteries may fail to charge.

14.1 REFLECTED NOISE

If the UPS is connected to a load that can produce voltage spikes that exceed the maximum output voltage of the UPS, then the UPS will react by firing its voltage crowbar circuits and shut down.

This is required as part of certification. Every effort has been taken to filter out any reflected load ripple or voltage spikes.

14.2 LOAD CURRENT SPIKES

Many loads do not draw a continuous or constant current. These changes in current may not be apparent or visible on an I.S. current meter. The spikes MUST be taken into account when calculating maximum load current. If the maximum output current of the UPS is exceeded then the UPS will respond by limiting its output voltage to a safe value.

This limiting of the output voltage in response to load current surges may appear to the casual observer as output noise or ripple of the UPS.

This limiting of output voltage in response to current surges above the UPS maximum is a requirement of the I.S. explosion protection standards.

Therefore if it is intended to operate the UPS at or near its maximum output current it would be wise to check for high frequency load current spikes or surges.

14.3 INPUT/OUTPUT TERMINATIONS

Connections to the UPS are made via the flameproof connector type TBA for the mains supply. The connector is wired as follows:-

PIN1 Active

PIN2 Pilot (short pin)

PIN3 Active / Neutral

Note that the earth connection is provided via a small cable strap between plug and socket.

The I.S. output is provided via a two pin TBA plug and socket or via an IP55 rated gland. The I.S. DC output connector is wired as follows:-

PIN1 + VE RED

PIN 2 - VE BLACK

When the gland is fitted a two way terminal block is mounted within the enclosure on the encapsulation surface with two wires coming from within the encapsulation and terminated in the terminal block. The wires are colour coded as follows:-

RED +VE output

BLACK -VE output

15 CERTIFICATION

The UPS has the following certification;

15.1 IECEx

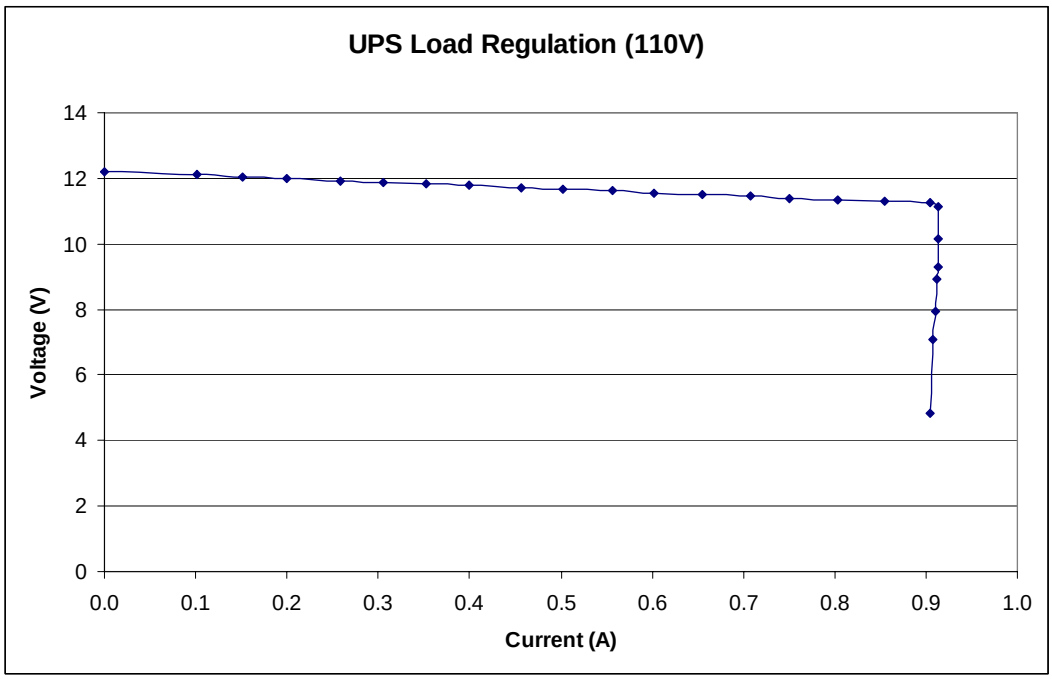
Certificate No:	IECEx TSA 13.0017X
Marking:	AC Mains Input ON: Ex ma eb ia [ia] I Mb
	AC Mains Input OFF: Ex ma ia [ia] I Ma
Port Parameters:	Refer to Certificate
Conditions of Use:	Refer to Certificate

15.2 ATEX

Certificate No:	Presafe 14 ATEX 4350X
Marking:	AC Mains Input ON:  I M2 Ex ma eb ia [ia] I Mb
	AC Mains Input OFF:  I M1 Ex ma ia [ia] I Ma
Port Parameters:	Refer to Certificate
Conditions of Use:	Refer to Certificate

16 SPECIFICATIONS

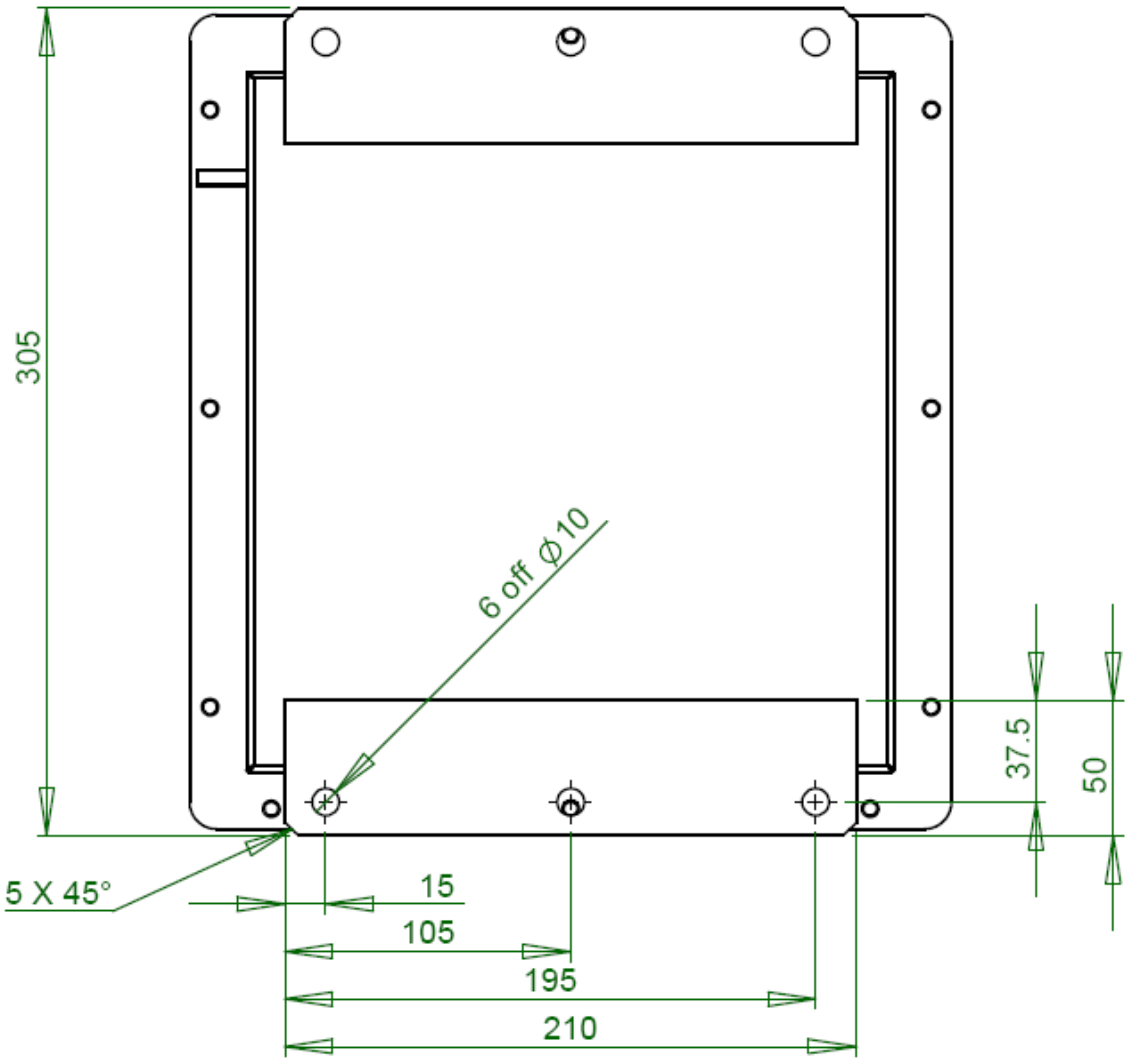
16.1 LOAD REGULATION



16.2 SPECIFICATIONS

Input voltage	110V to 240V
Maximum input power	120VA
Output voltage	12V
Nominal output current	0.9A
Battery capacity	24Cells at 10A Hour Each
Maximum battery charge current	1A
Battery charge time	14 hours
Battery Mode time at 1A 12V load	8 hours
Size	240mm H x 310mm D x 290mm W
Mass	34kg
Operating Temperature	0 – 40^{o}C

17 GENERAL MOUNTING ARRANGEMENT



18 CONTACT

If you have any queries about this product please contact us by;

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